

**PATENT**

Atty Docket No.: 200208214-1

App. Ser. No.: 10/608,206

**REMARKS**

Favorable reconsideration of this application is respectfully requested in view of the amendments above and the following remarks.

Claims 1-16 and 18-42 are pending of which claims 1, 16, 33 and 39 are independent.

In the Office Action, claims 43-46 were withdrawn as being drawn to a non-elected invention. Claims 43-46 are canceled.

Claims 1, 6, 8, 10, 15 were rejected under 35 U.S.C. 102(e) as being anticipated by Kling et al., US 20010003207, referred to as Kling.

Claims 16-22, 25 and 29-41 were rejected under 35 U.S.C. 102(a) as being anticipated by Spitaels et al., US 20030125886, referred to as Spitaels.

Claims 2-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Montero et al., US 20030015983, referred to as Montero.

Claims 7, 10, 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 and 6 above, and further in view of Oprea et al., U.S. Patent 5,752,046, referred to as Oprea.

Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Bradley et al., US 20030177406, referred to as Bradley.

Claims 11-12, 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Ochler et al., US 20040003303, referred to as Ochler.

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Claims 23-24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 16 above, and further in view of Lee et al. US 20030204762, referred to as Lee.

Claims 26-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 16 above, and further in view of Opreescu.

Claim 28 was rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels

Claim 42 was rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 33 above, and further in view of Kling.

These rejections are traversed for the reasons stated below.

**Examiner Interview Conducted**

The Applicants thank Examiner Tran for granting the personal interview conducted with Ashok Mannava on February 21, 2006. During the interview, the amendments to independent claims 1, 16 and 39 were discussed. It was agreed that the amendments overcome the rejections. Independent claim 33 was discussed. It was argued that Spitaels compares a temperature to a threshold but does not determine the availability of cooling resources. Examiner Tran appeared to agree that Spitaels does not teach or suggest determining the availability of cooling resources but further review was needed.

**Drawings**

The Applicants thank the Examiner for indicating that the drawings filed on June 30, 2003 are accepted.

**PATENT****Atty Docket No.: 200208214-1  
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According to an embodiment, a power supply for one or more computer systems is selected and implemented based on a nominal power consumption of the computer system rather than based on a maximum power consumption of the computer system. The nominal power consumption is less than the maximum power consumption of the computer systems. For example, a nominal power consumption may be based on the average power consumed by the components of the computer systems, which may include the average power consumption, some tolerance associated with the average power consumption such as a standard deviation of the average power consumption, a power consumption based on running a typical workload, etc. See Applicants' Specification, p. 5, lines 6-19.

A power supply that is operable to generate at least the nominal power consumption is implemented for one or more computer systems. See page 5, lines 20-25. For example, the power supply implemented for the computer systems may have a maximum power output that is approximately equal to or within a predetermined tolerance of the nominal power consumption of the computer system. Generally, the power supply that is implemented for the computer systems is smaller than a power supply designed for a maximum power consumption state of the computer systems. Accordingly, the power supply costs are typically reduced. In addition to reducing the cost of the power supply, the cost of associated components may be reduced. For example, a less expensive power bus or power wires may be used, because these components may be designed for a lower power capacity. Also, a smaller and less expensive cooling system may be used, because a smaller power supply dissipating less heat is used. If less heat is dissipated, then the peak cooling capacity of the cooling system is lower. Thus, a less powerful and typically less expensive cooling system

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may be implemented. For example, a cooling system may require two blowers or a larger blower if the power supply is designed for a maximum power consumption state of the computer system. By using a smaller power supply, a smaller, less expensive blower may be used to cool the computer system.

In some instances, the computer systems may demand more power than can be generated by the power supply because the power supply is designed for the nominal power consumption of the computer systems instead of the maximum power consumption of the computer systems. A power provisioning system is operable to reduce power consumption of the computer systems prior to the power demand of the computer systems exceeding the maximum power output of the power supply. Therefore, the power provisioning system minimizes the possibility of down time caused by insufficient power for the computer systems.

According to an embodiment, a cooling provisioning system is also provided that is operable to determine the availability of cooling resources and redistribute cooling resources or request that components or computer systems be placed in a lower-power state if insufficient cooling resources are available for cooling the computer systems. For example, the cooling system is designed for nominal heat dissipation rather than maximum heat dissipation of the computer systems. Thus, there may be instances, such as during peak demands, when there is not enough cooling fluid to cool the computer systems.

The cooling provisioning system determines whether a sufficient amount of cooling resources are available to cool the computer systems. See Equation 1 on p. 35 and p. 9, lines 20-22. The amount of volumetric air flow needed to cool computer systems is calculated. The cooling provisioning system may determine the amount of cooling fluid available and

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redistribute cooling fluid accordingly if available, such as described with respect to tables 1-3 on pages 34-38.

**Claim Rejections Under 35 U.S.C. §102**

The test for determining if a reference anticipates a claim, for purposes of a rejection under 35 U.S.C. § 102, is whether the reference discloses all the elements of the claimed combination, or the mechanical equivalents thereof functioning in substantially the same way to produce substantially the same results. As noted by the Court of Appeals for the Federal Circuit in *Lindemann Maschinenfabrick GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984), in evaluating the sufficiency of an anticipation rejection under 35 U.S.C. § 102, the Court stated:

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

Therefore, if the cited reference does not disclose each and every element of the claimed invention, then the cited reference fails to anticipate the claimed invention and, thus, the claimed invention is distinguishable over the cited reference.

1. Claims 1, 6, 8, 10, 15 were rejected under 35 U.S.C. 102(e) as being anticipated by Kling.

Independent claim 1 recites:

wherein the power supply for the at least one computer system has a maximum power output based on an average power consumption of the at least one computer system.

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This feature is not taught by Kling. Kling discloses in paragraph 0017 that a computer system is plugged into a power outlet. The computer system draw more power from the power outlet than can be provided, causing a circuit breaker to be tripped. Kling discloses reducing the power consumption of an IC when power consumption reached a threshold. Kling, however, fails to disclose anything about the power supply of the computer system. Instead, Kling is focused on the limitations of a circuit connected to a power outlet which may be used to supply power to computer system plugged into the power system. Kling fails to teach that a power supply for a computer system or a circuit connected to a power outlet is designed based on the average power consumption of the computer system. Accordingly, claims 1-15 are believed to be allowable.

Claim 10 recites:

prioritizing applications running on the multiple computer systems;  
wherein the step of placing one or more components in a lower-power state further comprises identifying one of the multiple computer systems running one or more low priority applications, and placing at least one component in the identified computer system in a lower-power state.

The rejection alleges paragraph 0031 of Kling teach these features. In paragraph 0031, Kling discloses that a throttle signal may be sent to ICs that have minimal impact on the operation of the computer system, such as a video terminal or external memory, or to device not necessary for the execution of instructions by the processors. Kling, however, fails to teach prioritizing applications and placing components running low priority applications in a lower-power state. Furthermore, processors are used to run low priority applications. Thus, according to Kling, the processors would not be placed in a lower-power

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state because it would affect the execution of the instructions and have a greater than minimal impact of the operation of the computer system.

2. Claims 16-22, 25 and 29-41 were rejected under 35 U.S.C. 102(a) as being anticipated by Spitaels.

Independent claim 16 recites, "wherein the maximum capacity of the power supply is based on an average power consumption of the at least one computer system."

Spitaels discloses determining whether branch circuits can provide power to computer systems in a data center without being overloaded. Spitaels discloses placing the computer systems in a state where they are fully loaded to consume the maximum amount of power. See paragraph 0028. The current drawn is measured to determine whether an overload condition in the branch circuit can result. If so, corrective action is taken, such as adding a branch circuit, moving equipment, or adding a UPS. See paragraph 0042.

Spitaels also discloses that the electrical design of data centers is determined based on the maximum power consumption of the computer systems or conservative values much greater than the maximum power consumptions. See paragraph 0007. Furthermore, as described above, Spitaels discloses designing the branch circuits for a data center based on the maximum power consumption of the computer systems by placing the computer systems at maximum power consumption and determining whether the branch circuits are overloaded. If so, redesigning is performed, such as through the corrective actions described above, to accommodate the maximum power consumptions. Thus, Spitaels fails to teach a power

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supply designed based on the average power consumption of one or more computer systems.

Accordingly, claims 16 and 18-34 are believed to be allowable.

Claim 18 recites:

the maximum capacity of the at least one power supply is  
approximately equal to the average power consumption of the at least one  
computer system.

Spitaels fails to teach this feature for the reasons stated above.

Claim 19 recites:

the power provisioning system is connected to a cooling system  
and is operable to receive messages from the cooling system associated  
with the availability of cooling resources for cooling the at least one  
computer system.

The rejection alleges paragraphs 0016 and 0054-0056 of Spitaels disclose these features. Spitaels discloses in paragraph 0016 interrupting power to a device when temperatures exceed a threshold. Spitaels also discloses in paragraph 0054 that a controller for a power control system can control air conditioning systems to increase their outputs to prevent problems. Spitaels, however, fails to teach the power control system receiving a message from the air conditioning system. Furthermore, Spitaels fails to teach receiving a message from the air conditioning system regarding the availability of cooling resources. Instead, Spitaels discloses the power control system is connected to the temperature sensors, and the power control system can interrupt power to a device when temperatures exceed a threshold. Even if the temperature is above a threshold, a cooling system may still have sufficient cooling fluid to increase cooling fluid to the device or may have sufficient cooling



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fluid to redistribute cooling fluid from another device to the device having heat dissipation above the threshold. Spitacls does not disclose determining the availability of cooling resources or sending a message from a cooling system to a power provisioning system regarding the availability of resources.

Furthermore, it is not inherent that because Spitacls determines temperature that Spitacls discloses determining the availability of cooling resources, because in Spitacls temperatures in Spitacls may exceed a threshold even if cooling resources are available.

Furthermore, the rejection in footnote 2 on page 8 alleges that the temperature sensors communicate to the power control system of Spitacls by intelligent air conditioning systems. This is not supported by Spitacls. Spitacls does not disclose any messages or temperatures received from the air conditioning systems at the power control system. Instead, Spitacls discloses the temperature sensors are connected to the controller 201 of the power control system and the controller receives information from the temperature sensors and not by way of the air conditioning systems 404 and 406. See paragraph 0054.

Regarding claim 20, Spitacls fails to teach receiving a message from the cooling system indicating that insufficient cooling resources are available for cooling the at least one computer system.

Claim 21 recites,

wherein the power provisioning system is operable to place at least one of the at least one component currently in a lower-power state in a higher-power state in response to receiving a message from the cooling system indicating that excess cooling resources are available.

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The rejection alleges these features are inherent in Spitaels. The rejection states:

It is inherent that that system would places the at least one component currently in a lower-power state in a higher-power state in response to receiving a message [there is sufficient cooling] from the intelligent air conditioning system indicating that excess cooling resources are available else the system would be inoperable.

It is the burden of the Examiner and not the Applicants to prove that the claimed feature is inherent. Secondly, to establish inherency, the Examiner must make clear that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. "Inherency, however, *may not be established by probabilities or possibilities*. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

To be inherent, Spitaels must necessarily require increasing the power consumption of a device if sufficient cooling resources are available. Spitaels, however, does not necessarily require increasing the power consumption of a device. Instead, Spitaels may simply conclude that corrective action needs to be taken, because temperatures exceed a threshold prior to sufficient cooling resources becoming available. Then, Spitaels may stop intentionally increasing the load of the device from maximum power consumption and resume normal operation prior to cooling resources becoming available. Nothing in Spitaels requires increasing the power consumption of a device if sufficient cooling resources are available. Thus, the Examiner has fails to meet the burden of proving this feature is inherent.

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Independent claim 33 recites:

wherein the power provisioning system is operable to control power consumption of at least one of the multiple computer systems based on the availability of cooling resources for cooling the multiple computer systems.

Spitaels fails to teach controlling power consumption based on the availability of cooling resources. Spitaels discloses in paragraph 0016 interrupting power to a device when temperatures exceed a threshold. Even if the temperature is above a threshold, a cooling system may still have sufficient cooling fluid to increase cooling fluid to the device or may have sufficient cooling fluid to redistribute cooling fluid from another device to the device having heat dissipation above the threshold. For example, according to an embodiment described in the Applicants specification, Equation 1 on p. 35 may be used to calculate amount of cooling resources needed, such as the volumetric air flow needed to cool a component or computer system and determining whether sufficient cooling fluid is available to cool a component. Spitaels fails to teach determining the cooling resources needed to cool a system or determining the availability of cooling resources. Thus, claims 33-38 are believed to be allowable.

Spitaels fails to teach a cooling system transmitting messages to a power provisioning system regarding cooling resources as recited in claim 35 or a power provisioning system operable to increase power consumption of at least one of the multiple computer systems in response to receiving a message indicating excess cooling resources are available for cooling the multiple computer systems as recited in claim 35..

Independent claim 39 recites, "the power supply means has a maximum power output based on an average power consumption of the at least one computer system." This feature is

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not taught by Spitaels for the reasons stated above. Thus, claims 39-42 are believed to be allowable.

**Claim Rejections Under 35 U.S.C. §103(a)**

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in MPEP § 706.02(j):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Therefore, if the above-identified criteria are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

1. Claims 2-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Montero et al., US 20030015983, referred to as Montero.

Claims 2-5 are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

Also, Montero discloses controlling the operation of one or two fans based on the temperature of a CPU. Montero, however, fails to teach or suggest placing a component in a

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higher-power state, such that the at least one component consumes more power, in response to excess cooling resources being available. Montero discloses determining temperature but does not disclose determining when excess cooling resources are available. A decrease in temperature does not necessarily result in excess cooling resources being available.

Accordingly, claim 3 is also believed to be allowable for this reason.

Claim 4 recites, "determining whether an amount of cooling fluid distributed to the at least one computer system is less than an excess cooling fluid threshold." Montero fails to teach or suggest determining the amount of cooling fluid distributed to a computer system as alleged in the rejection. Claim 5 recites, "determining whether an amount of cooling fluid distributed to the at least one computer system exceeds a threshold associated with the maximum capacity of the cooling system." Montero fails to teach or suggest these features. Accordingly, claims 4 and 5 are believed to be allowable.

2. Claims 7, 10 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 and 6 above, and further in view of Opreescu et al., U.S. Patent 5,752,046, referred to as Opreescu.

Claims 7, 10 and 13 are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

3. Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Bradley et al., US 20030177406, referred to as Bradley.

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Claims 9 is believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

4. Claims 11-12, 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kling as applied to claim 1 above, and further in view of Oehler et al., US 20040003303, referred to as Oehler.

Claims 11-12 and 14 are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

5. Claims 23-24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 16 above, and further in view of Lee et al. US 20030204762, referred to as Lee.

Claims 23-24 are believed to be allowable for at least the same reasons claim 16 is believed to be allowable.

6. Claims 26-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 16 above, and further in view of Opreacu.

Claims 26-27 is believed to be allowable for at least the same reasons claim 16 is believed to be allowable.

7. Claim 28 was rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels

Claims 28 is believed to be allowable for at least the same reasons claim 16 is believed to be allowable.

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8. Claim 42 was rejected under 35 U.S.C. 103(a) as being unpatentable over Spitaels as applied to claim 33 above, and further in view of Kling.

Claim 42 is believed to be allowable for at least the same reasons claim 39 is believed to be allowable.

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**Conclusion**

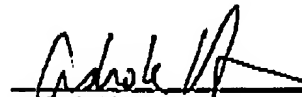
In light of the foregoing, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should the Examiner believe that a telephone conference with the undersigned would assist in resolving any issues pertaining to the allowability of the above-identified application, please contact the undersigned at the telephone number listed below. Please grant any required extensions of time and charge any fees due in connection with this request to deposit account no. 08-2025.

Respectfully submitted,

Dated: February 21, 2006

By



Ashok K. Mannava

Registration No.: 45,301

MANNAVA & KANG, P.C.  
8221 Old Courthouse Road  
Suite 104  
Vienna, VA 22182  
(703) 652-3822  
(703) 880-5270 (facsimile)